



WAP™ MMS Client Transactions

Version 15-Jan-2002

Wireless Application Protocol
Multimedia Messaging Service
Client Transactions Specification

WAP-206-MMSCTR-20020115-a

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1. Scope

The Wireless Application Protocol (WAP) is a result of continuous work to define an industry-wide specification for developing applications that operate over wireless communication networks. The scope for the WAP Forum is to define a set of specifications to be used by service applications. The wireless market is growing very quickly, and reaching new customers and services. To enable operators and manufacturers to meet the challenges in advanced services, differentiation and fast/flexible service creation WAP Forum defines a set of protocols in transport, security, transaction, session and application layers. For additional information on the WAP architecture, please refer to “*Wireless Application Protocol Architecture Specification*” [WAPARCH].

Multimedia Messaging Service (MMS) is a system application by which a WAP client is able to provide a messaging operation with a variety of media types. The service is described in terms of actions taken by the WAP MMS Client and its service partner, the MMS Proxy-Relay, a device that operates as a WAP Origin Server for this specialised service. This specification defines the operational flow of the messages that transit between the MMS Client and the MMS Proxy-Relay. The format of the specific messages is described in the “*WAP MMS Encapsulation Protocol*” [MMSENCAPS].

For information about the MMS Architecture, the reader is advised to become familiar with the “*WAP MMS Architecture Overview*” [MMSARCH]

2. Document Status

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2.3 Comments

Comments regarding this document can be submitted to the WAP Forum in the manner published at <http://www.wapforum.org/>.

3. References

3.1 Normative References

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- [WAPWSP] "Wireless Application Protocol, Wireless Session Protocol Specification", WAP-203-WSP, WAP Forum, 4-May-2000. URL: <http://www.wapforum.org>

3.2 Informative References

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- [PUSHARCH] "Wireless Application Protocol, Push Architecture Overview", WAP-165-PushArchOverview, WAP Forum, 08-November-1999. URL: <http://www.wapforum.org/>
- [WAPARCH] "Wireless Application Protocol, Architecture Specification", WAP-100-WAPArch, WAP Forum, 30-April-1998. URL: <http://www.wapforum.org/>
- [WTLS] "Wireless Application Protocol, Wireless Transport Layer Security Specification", WAP-199-WTLS, WAP Forum, 18-February-2000. URL: <http://www.wapforum.org/>

4. Definitions and Abbreviations

4.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described by [RFC2119].

4.2 Definitions

This section introduces a terminology that will be used throughout this document.

Multimedia Messaging Service (MMS)

A system application by which a WAP client is able to provide a messaging operation with a variety of media types.

MMS Client

The MMS service endpoint located on the WAP client device.

MMS Proxy-Relay

A server which provides access to various messaging systems. If the MMS Proxy-Relay operates as a WAP origin server it may be able to utilise features of the WAP system.

MMS Server

A server that provides storage and operational support for the MMS service.

MMS_M Link

The interface between the MMS Client and its service partner, the MMS Proxy-Relay.

Terminal

A WAP client device.

Transaction

One or more message exchanges that collectively are considered logically separate from other message exchanges.

WAP Origin Server

A server that can deliver appropriate content upon request from a WAP client.

4.3 Abbreviations

For the purposes of this specification the following abbreviations apply.

Email	Electronic mail
HTTP	HyperText Transport Protocol
IANA	Internet Assigned Numbers Authority
ID	Identifier
MIME	Multipurpose Internet Mail Extensions

MM	Multimedia Message
MMS	Multimedia Messaging Service
OTA	Over The Air
PDF	Portable Document Format
PDU	Protocol Data Unit
RDF	Resource Description Format
RFC	Request For Comments
UAProf	User Agent Profile
URI	Uniform Resource Identifier
WAP	Wireless Application Protocol
WSP	Wireless Session Protocol
WTLS	Wireless Transport Layer Security
XML	eXtensible Markup Language

5. Introduction

This section is informative.

The Multimedia Messaging Service (MMS) is intended to provide non-real-time messaging services to consumers utilising WAP technologies. It is an application level service that fits into the current WAP architecture. The following figure shows the general MMS Architecture.

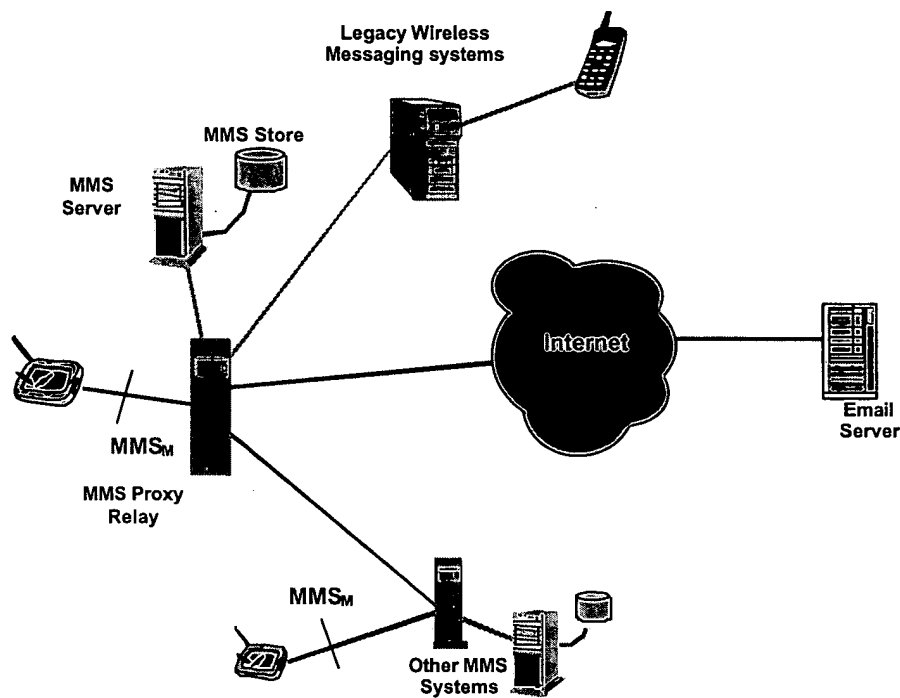


Figure 1. MMS Network Diagram with MMS Client to MMS Proxy-Relay Link Highlighted

The MMS client transactions described by this document take place on the interface labelled MMS_M in the preceding diagram.

The following figure presents an amplified view of the MMS_M link. It is built on top of the WAP architecture. In its role as an application, MMS provides for the delivery and services related to messaging and the data schemes that will permit presentation methods that provide for the multimedia user experience. These presentation methods are separate from MMS.

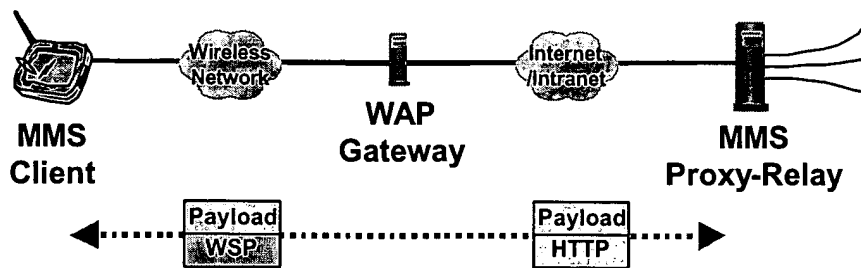


Figure 2. WAP Implementation of MMS_M Interface

This figure includes a few items that need to be described. The MMS Proxy-Relay is the network entity that interacts with the user mailbox and is responsible for initiating the notification process to the MMS Client. The WAP Gateway provides standard WAP services needed to implement MMS, these include: WSP invocation of HTTP methods, see [WAPWSP]; WAP PUSH services, see [PUSHARCH]; OTA security, see [WTLS]; and, Capability Negotiations, see [UAPROF].

The above figure also shows a payload that is carried by WSP and HTTP. This payload is described in the MMS Message Encapsulation [MMSENCAPS] document. It is expected that this data will be transported in its entirety between the MMS Proxy-Relay and the MMS Client.

This description does not address issues related to the movement or acquisition of MM messages beyond the MMS Proxy-Relay as these are outside the scope of the MMS_M link.

6. Introduction to MMS Transaction Model

This section is informative.

The MMS service is realised by the invocation of transactions between the MMS Client and the MMS Proxy-Relay. These transactions include information and affect state changes on these devices. This section introduces example transaction flows and section 7 describes each individual, logically separate transaction in more detail.

The general transaction flows on MMS_M for sending and retrieving MM messages do not depend on what type of client the MM message is sent to or received from. The other endpoint for the MM message may be another MMS Client served by the same or another MMS Proxy-Relay, it may be a client on a legacy wireless messaging system, or it may be an e-mail server.

The following three figures provide general views of the MMS_M transactions needed for: 1) an MMS Client to send an MM message and receive back a resulting delivery notice; 2) an MMS Client to perform immediate retrieval of a new MM message; and, 3) an MMS Client to perform delayed retrieval of a new MM message. The arrow labels in the following figures indicate the MMS messages (also known as MMS PDUs) exchanged during transactions. These messages are defined in detail in [MMSENCAPS].

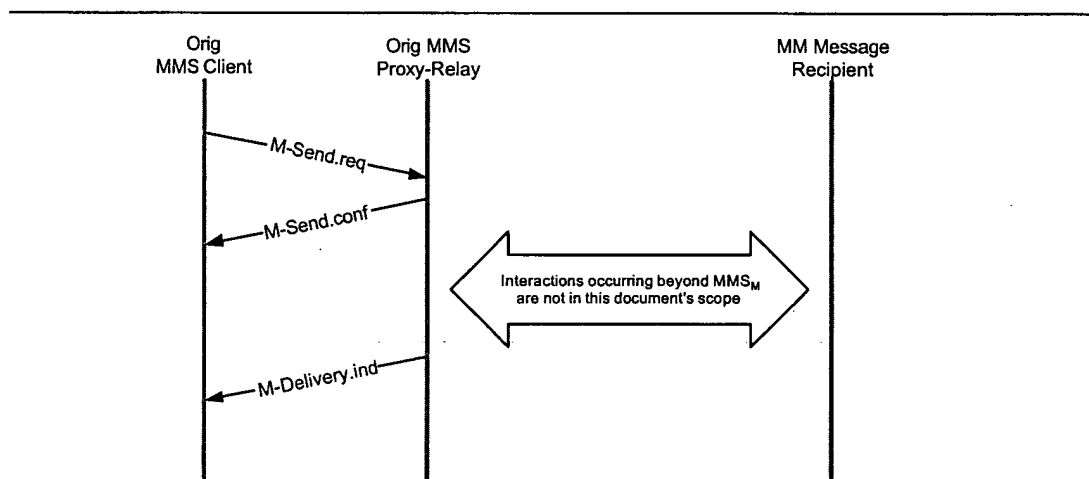


Figure 3. Example MMS_M Transaction Flow – Sending

A receiving MMS Client is said to perform immediate retrieval of a new MM message when it retrieves the data from the MMS Proxy-Relay before acknowledging the message notification.

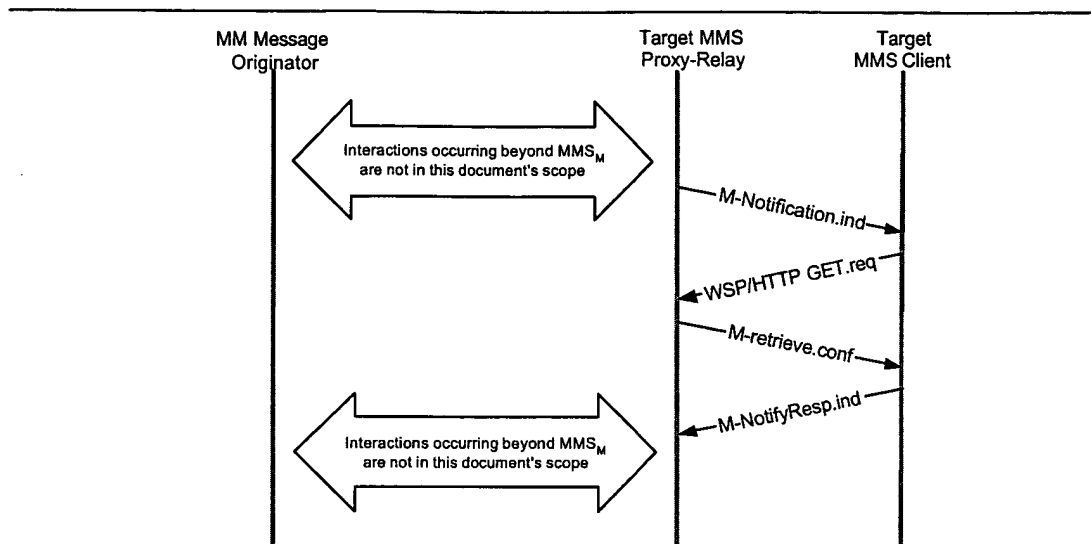


Figure 4. Example MMS_M Transaction Flow – Immediate Retrieval

A receiving MMS Client is said to perform delayed retrieval of a new MM message when it first acknowledges the notification and at some later point retrieves the message from the MMS Proxy-Relay.

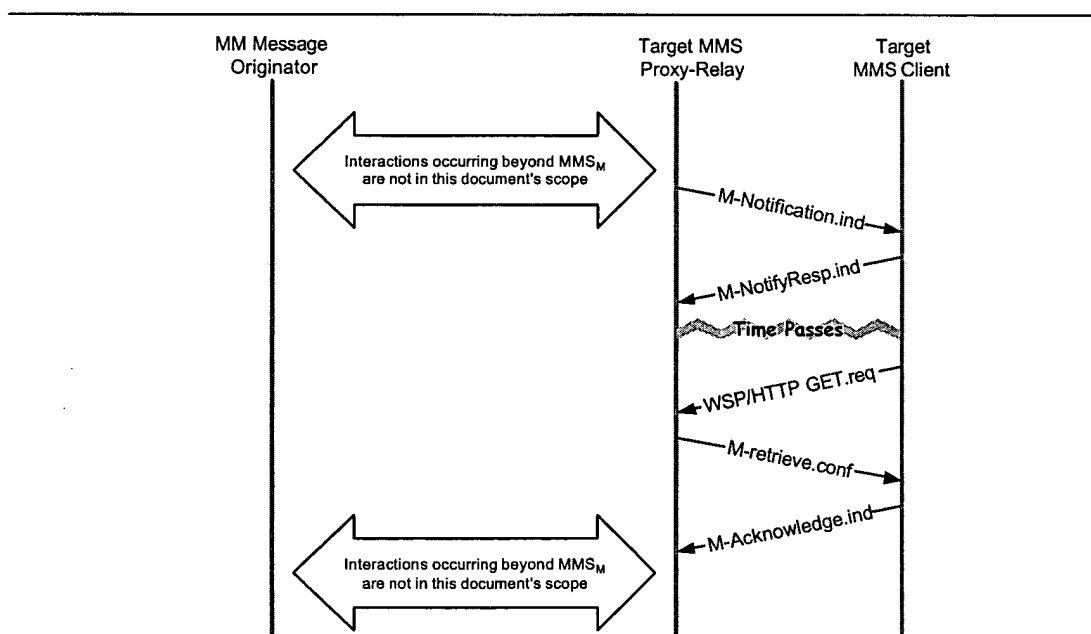


Figure 5. Example MMS_M Transaction Flow – Delayed Retrieval

If both endpoints for the MM message exchange are MMS Clients, the MMS_M interface is involved both when the originating MMS Client sends the MM message to the originating MMS Proxy-Relay and when the target MMS Client retrieves the MM message from the target MMS Proxy-Relay. The following figure shows an example where both endpoints are MMS Clients and delayed retrieval is used.

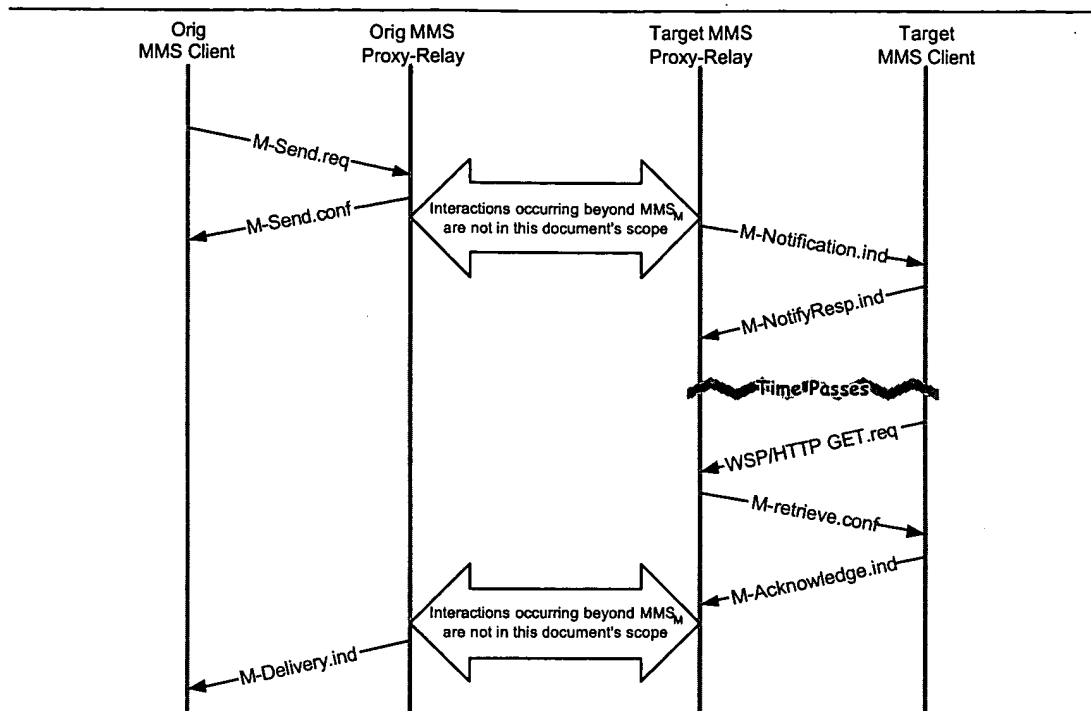


Figure 6. Example MMS Transaction Flow – Delayed Retrieval

As can be seen in these examples, several message exchanges occur on MMS_M . These message exchanges can be considered to form the following logically separate transactions:

- MMS Client Sending Message to MMS Proxy-Relay
- MMS Proxy-Relay Sending Notification to MMS Client
- MMS Client Fetching Message from MMS Proxy-Relay
- MMS Proxy-Relay Sending Delivery Report to MMS Client

These transactions are described in more detail in section 7.

6.1 Error Considerations

Section 7 also contains general error considerations for each transaction. For more specific information, the reader is referred to the [MMSENCAPS] and [WAPWSP] documents. The [MMSENCAPS] document also contains considerations for the case where the MMS Client and the MMS Proxy-Relay implement different versions of the MMS_M protocol described here.

7. MMS Client Transactions

This section is normative.

The PDUs and information elements referred to in the following SHALL comply with the definitions in [MMSENCAPS].

7.1 MMS Client Sending Message to MMS Proxy-Relay

The process for a client to send a message is built on top of the **M-Send** transaction. It provides the mechanism for the MMS Client to submit an MM message to the MMS Proxy-Relay and to get back information in response. The following Figure 7 gives an example of this transaction.

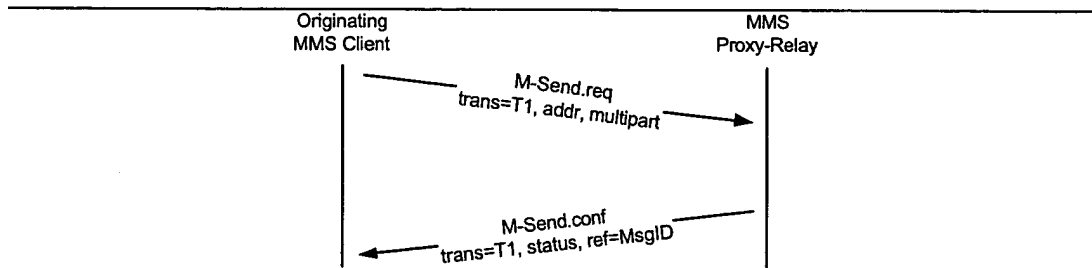


Figure 7. Example **M-Send** Transaction Flow

7.1.1 Transaction Flow

The MMS Client that wishes to send an MM message SHALL invoke a WSP/HTTP **POST** operation with the **M-Send.req** message embedded as the content body. This message is submitted using a URI that addresses the MMS Proxy-Relay that supports the specific MMS Client.

The MMS Client SHALL compose a transaction ID for the submitted message. This transaction ID is used by the MMS Client and MMS Proxy-Relay to provide linkage between the originated **M-Send.req** and the response **M-Send.conf** messages. The value used for the transaction ID is determined by the MMS Client and no interpretation is expected by the MMS Proxy-Relay.

Upon receipt of the **M-Send.req** message, the MMS Proxy-Relay SHALL respond to the WSP/HTTP **POST** with a response that includes the **M-Send.conf** message in its body. This response message SHALL provide a status code for the requested operation. If the MMS Proxy-Relay is willing to accept the request to send the message, the status SHALL be '**accepted**' and the message SHALL include a message-ID that MAY be used for following activities that need to refer to the specific sent message (e.g. delivery reports).

7.1.2 Error Considerations

Various error cases may exist. These include network faults, server faults and service faults. For network faults (e.g. server not available) or server faults (e.g. bad path) the MMS Client SHALL receive an error indication that relates to the WSP/HTTP error that was detected. These errors MAY be recoverable (e.g. MMS Proxy-Relay down temporarily) or may be more permanent in nature. Strategies for recovery or retry are beyond the scope of this document to address.

Service errors are different. In these cases the MMS Proxy-Relay actually received the **M-Send.req** message and responds with an **M-Send.conf** message with the appropriate error code.

7.2 MMS Proxy-Relay Sending Notification to MMS Client

To inform an MMS Client that an MM message is available and for it to return back information, a set of asynchronous messages, **M-Notification.ind** and **M-NotifyResp.ind**, are utilized. This provides the mechanism for the MMS Proxy-Relay to notify the MMS Client with certain factors about the new MM. This will let the MMS Client retrieve the MM.

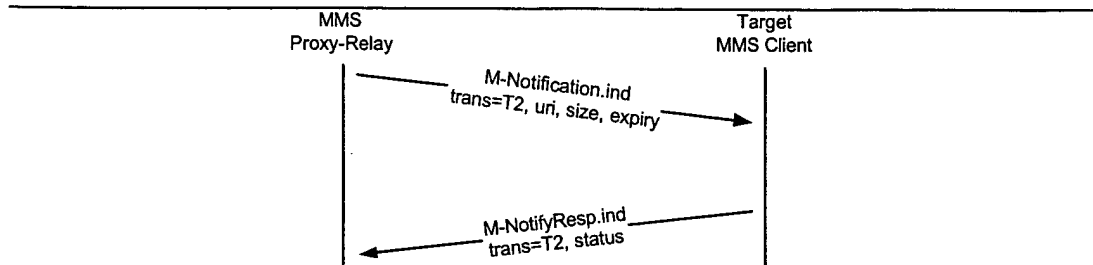


Figure 8. Example MMS Notification of MM message to Target Client

7.2.1 Transaction Flow

The MMS Proxy-Relay SHALL utilise the **M-Notification.ind** message when it needs to inform the MMS Client that a message is available for delivery. The **M-Notification.ind** message SHALL be sent by the MMS Proxy-Relay to the MMS Client using the WAP PUSH framework [PUSHARCH]. The **M-Notification.ind** message SHALL be sent as the message body of a [PUSHMSG]. The X-Wap-Application-Id message header of that push message MUST be set to 'x-wap-application:mms.ua' if the absoluteURI form of the app-id syntax is used, and MUST be set to '4' if the app-assigned-code form of the app-id syntax is used.

The information conveyed SHALL include an [RFC2396] compliant URI that will be used to actually retrieve the message in a subsequent operation by the MMS Client. Additional information about the message (e.g. message size, expiry) MAY be used by the MMS Client to determine its behaviour. For example, the MMS Client MAY delay the retrieval of the message until after a user confirmation if it exceeds a size threshold.

The MMS Proxy-Relay SHALL compose a transaction ID for the notification message. This transaction ID is used by the MMS Client and MMS Proxy-Relay to provide linkage between the originated **M-Notification.ind** and the response **M-NotifyResp.ind** messages. The value used for the transaction ID is determined by the MMS Proxy-Relay and no interpretation is expected by the MMS Client.

Upon receipt of the **M-Notification.ind** message, the MMS Client SHALL respond by invoking a WSP/HTTP **POST** operation with an **M-NotifyResp.ind** message embedded as the content body. This message is submitted using a URI that addresses the MMS Proxy-Relay that supports the specific MMS Client. The MMS Client SHOULD ignore the associated WSP/HTTP **POST** response from the MMS Proxy-Relay.

The **M-NotifyResp.ind** response message SHALL provide a message retrieval status code. The status 'retrieved' SHALL be used only if the MMS Client has successfully retrieved the MM message prior to sending the **NotifyResp.ind** response message.

7.3 MMS Client Fetching Message from MMS Proxy-Relay

The operation for retrieval of the MM message by the MMS Client from the MMS Proxy-Relay is built upon the normal WSP/HTTP **GET** functionality. Therefore, no new operation is actually defined. The message type for the message returned from the MMS Proxy-Relay to the MMS Client is **M-retrieve.conf**.

Delivery of the MM message MAY be either before or after the **M-NotifyResp.ind** message, depending on immediate retrieval or delayed retrieval of MM message respectively. The MMS Proxy-Relay MAY therefore decide to request an acknowledgement from the MMS Client to confirm successful retrieval in case of delayed retrieval. These variations are shown in Figure 9 and Figure 10 respectively.

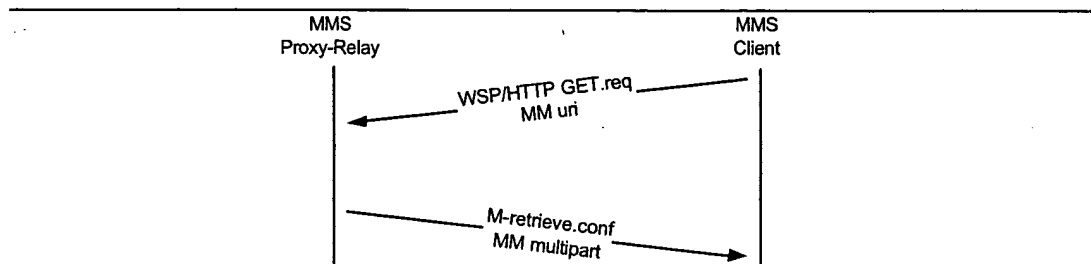


Figure 9. Example MMS Retrieval Transaction without Acknowledgement

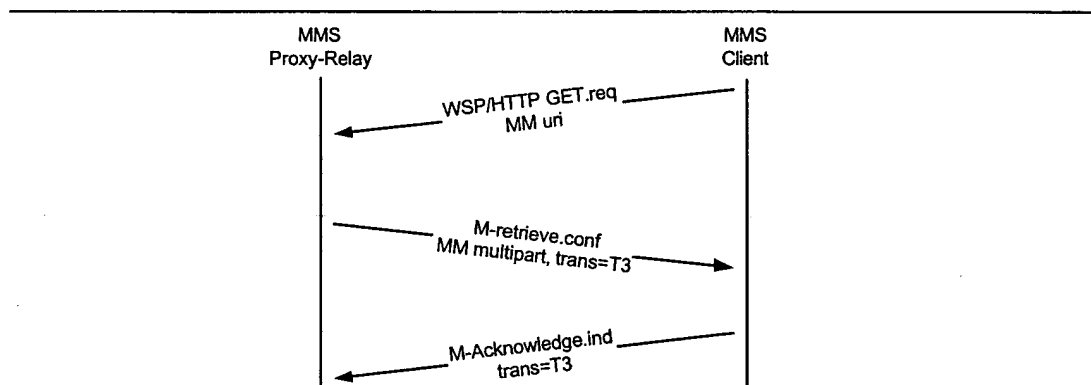


Figure 10. Example MMS Retrieval Transaction with Acknowledgement

7.3.1 Transaction Flow

The MMS Client SHALL initiate the retrieval activity by utilizing the URI that was delivered to it in the **M-notification.ind** message using the connection oriented mode of the normal WSP/HTTP **GET** method operation.

When setting up the WSP session and when sending the GET request the MMS Client SHOULD convey the capabilities of the terminal and of the MMS Client. For more details see section 8 on Terminal Capability Negotiation.

The response message **M-retrieve.conf**, if successful, contains the MM message. This MM message SHALL include MMS headers providing additional information.

Depending on the MMS Proxy-Relay needs, the **M-retrieve.conf** response that it provides MAY request an acknowledgement to be generated by the MMS Client. The MMS Proxy-Relay MAY make this request based on whether or not it needs to provide a delivery notice back to the originator of the MM message. Alternatively, it MAY make that request based upon an expectation that it would then be able to delete the message from its own store. This decision is not a part of this transaction.

The MMS Proxy Relay SHALL make this request for acknowledgement by including a transaction ID in the **M-retrieve.conf** message. This transaction ID is used by the MMS Client and MMS Proxy-Relay to provide linkage between the originated **M-retrieve.conf** and the response **M-Acknowledge.ind** messages. The value used for the transaction ID is determined by the MMS Proxy-Relay and no interpretation is expected by the MMS Client.

If an acknowledgement is requested, the MMS Client SHALL respond by invoking a WSP/HTTP **POST** operation with an **M-Acknowledge.ind** message embedded as the content body. This message is submitted using a URI that addresses the MMS Proxy-Relay that supports the specific MMS Client. The MMS Client SHOULD ignore the associated WSP/HTTP **POST** response from the MMS Proxy-Relay. The **M-Acknowledge.ind** message confirms successful MM message retrieval to the MMS Proxy Relay.

7.3.2 Error Considerations

If the URI can not be resolved, a network or server fault MAY be returned. For example, if the MMS Server deletes the message from the store, making the requested message unavailable, it is expected that the WSP/HTTP request will generate a 'Data Not Available' status code (e.g. 404). In this case, the lower level error would be returned and no application level errors would be possible since no MM message data will be returned.

7.3.3 Clarifications

To some readers it may not appear consistent that the WSP/HTTP GET.req message is shown in Figure 9 and Figure 10 as this message belongs to a different protocol layer than the other messages. However, the figures are consistent in that they define the MMS Client Transactions in terms of the PDUs sent "across the wire" between peer entities (and not in terms of primitives, which are defined between layers in a protocol stack). The appearance of WSP/HTTP GET.req in the diagrams is not to be taken as a recommendation to bypass the implementation of layered protocols.

7.4 MMS Proxy-Relay Sending Delivery Report to MMS Client

To permit the originating MMS Client to know when a message delivery has occurred the **M-Delivery.ind** message has been defined to provide that information. The **M-Delivery.ind** message originates at the MMS Proxy-Relay providing information to the MMS Client about the message that was delivered. There is no associated response or acknowledgment message. The following Figure 11 shows an example of this message.

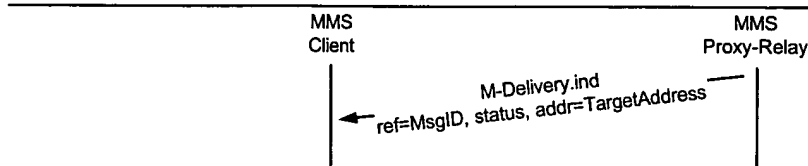


Figure 11. Example Delivery Report

7.4.1 Transaction Flow

The **M-Delivery.ind** message SHALL be sent by the MMS Proxy-Relay to the MMS Client using the WAP PUSH framework [PUSHARCH]. The **M-Delivery.ind** message SHALL be sent as the message body of a [PUSHMSG]. The X-Wap-Application-Id message header of that push message MUST be set to 'x-wap-application:mms.ua' if the absoluteURI form of the app-id syntax is used, and MUST be set to '4' if the app-assigned-code form of the app-id syntax is used.

The **M-Delivery.ind** message conveys information about the status of a particular message delivery that was performed. The message is identified by the Message ID that was generated when the original message was posted. It also provides addressing information of the originally targeted entity.

If an MM message was addressed to multiple entities, multiple **M-Delivery.ind** messages SHOULD be expected to be returned, one for each addressed entity.

7.4.2 Error Considerations

The **M-Delivery.ind** message is generated when the MMS Proxy-Relay is satisfied that it has sufficient information to declare that the message was delivered or other status can be declared. As such, there may be cases where the MMS Proxy-Relay makes a decision about the delivery status that may be incorrect (e.g. timer expiry may generate an expiry notice but MMS Client may actually retrieve message if the read occurred before the message was deleted).

There is no associated response or acknowledgment message defined for the **M-Delivery.ind** message. The success rate for transmittal of the **M-Delivery.ind** message is dependent upon the quality of service provided by the transport service(s) utilized.

7.4.3 Other Issues

A target MMS Client may, within an **M-NotifyResp.ind** message or an **M-Acknowledge.ind** message, request denial of an originator's request for delivery notification. Therefore, an MMS Client SHOULD NOT expect to receive all the **M-Delivery.ind** messages that it may have requested.

7.5 Read Reports

When the originating MMS Client requests the Read-Reply in a multimedia message, the receiving MMS Client MAY send a read message back to it. This message is sent and delivered using the normal mechanisms as described in this section.

To permit a user to determine that a message is a read reply, a few fields can be used to provide that information:

- The subject field **SHOULD** be copied from the original, prepending a 'Read:' to the text.
- The Message-ID of the original message is available and **SHOULD** be included in the message body.
- The body of the message **MAY** provide information about the read action or status.

The following is an example of a read reply message. It is in response to a message that user A had sent to user B:

From:	B
To:	A
Sent:	Friday, January 21, 2000 1:50 PM
Subject:	Read: My Message
Your message	
To:	B
Subject:	My Message
Message-ID:	<200002211806.MAA26265@mail1.domain.com>
Sent:	1/21/2000 1:29 PM
was read on 1/21/2000 1:50 PM.	

7.5.1 Transaction Flow

If supported by a receiving MMS Client, the read reply message is sent to the MMS Proxy-Relay when an MM message has been read that had been flagged with the **Read-Reply** flag. The message **SHALL** be sent using the normal **M-Send** operation as it is just another message origination. As such, it **SHALL** be delivered using the normal delivery methods. Due to the nature of the message, the **Message-Class** field **SHALL** have the value '**Auto**', the **Read-Reply** flag **MUST NOT** be set, and the **Delivery-Report** flag **MUST NOT** be set in a read-reply message.

The MMS Client receiving a read reply message will see it as a new message. The interpretation as a read-reply is done by context. In cases where the original message had multiple addresses, the MMS Client **SHOULD** expect that multiple read-reply messages will be returned.

7.5.2 Error Considerations

Origination and delivery of a read-reply message is as for a normal message and does not require additional error considerations.

7.5.3 Other Issues

Since read-reply is an optional capability of the receiving MMS Client, an originating MMS Client **SHOULD NOT** depend upon receiving a read-reply in all cases.

7.6 Security Considerations

Security aspects are considered outside the scope of this document and are not further discussed, except for the following paragraph.

At present, the end-to-end security aspects of the MMS_M PDUs are dependent upon the security provided by the transport service(s) utilized.

8. Terminal Capability Negotiation

This section is normative.

If the MMS Client performs capability negotiation then it **MUST** use the mechanism specified in [UAPROF]. The MMS Proxy Relay **SHOULD** support this mechanism.

If using capability negotiation, the MMS Client **SHALL** indicate its capabilities within the UAProf information by using attributes from the MMS Characteristics component defined below and **OPTIONALLY** by using attributes from other components of the UAProf schema. The MMS Proxy-Relay **SHOULD** use this information in preparation of messages to be delivered to the MMS Client.

The MMS Proxy-Relay **MAY** adjust a message to be delivered that contains media types that are not supported by the MMS Client. This adjustment **MAY** involve the deletion or adaptation of those unsupported media types.

8.1 MMS attributes in other components of the UAProf schema

This section is informative.

The UAProf specification includes a schema containing attributes that describe the client hardware, the browser user-agent, network characteristics and more. Some of the attributes included in the aforementioned specification also apply to the MMS Client, e.g. "ScreenSize", "CpuType", and "PushMessageSize". For a complete reference to the attributes available in the UAProf schema, please see [UAPROF].

8.2 Summary of the MMS Characteristics component

This section is informative. A normative description can be found in Appendix A.1.

The table below summarizes the attributes defined within the MMS Characteristics component.

Attribute	Description	Resolution Rule	Type	Sample Values
Component: MmsCharacteristics				
MmsMaxMessageSize	The maximum size of a multimedia message in bytes.	Locked	Number	20480
MmsMaxImageResolution	The maximum size of an image in units of pixels (horizontal x vertical).	Locked	Literal	"80x60"
MmsCcppAccept	List of supported content types conveyed as MIME types.	Locked	Literal bag	"image/jpeg", "audio/wav", "video/mpeg-4"
MmsCcppAcceptCharSet	List of character sets that the MMS Client supports. Each item in the list is a character set name registered with IANA.	Locked	Literal bag	"US-ASCII", "ISO-8859-1"
MmsCcppAcceptLanguage	List of preferred languages. The first item in the list should be considered the	Locked	Literal bag	"en", "fr"

	user's first choice. Property value is a list of natural languages, where each item in the list is the name of a language as defined by [RFC1766].			
MmsCcppAcceptEncoding	List of transfer encodings that the MMS Client supports. Property value is a list of transfer encodings, where each item in the list is a transfer encoding name as specified by [RFC2045] and registered with IANA.	Locked	Literal bag	"base64", "quoted-printable"
MmsVersion	The MMS versions supported by the MMS Client conveyed as majorVersionNumber.minorVersionNumber.	Locked	Literal bag	"2.0", "1.3"

9. Static Conformance Requirements

The format, contents and syntax of the tables in this section are as mandated by [CREQ].

The SCR items in the "Requirement" column can be found in the following WAP specifications:

- SCR items starting with "UAProf" are defined in [UAPROF].
- SCR items starting with "MMSE" are defined in [MMSENCAPS].
- SCR items starting with "MSG" are defined in [PUSHMSG].
- SCR items starting with "OTA" are defined in [PUSHOTA].
- SCR items starting with "WSP" are defined in [WAPWSP].

9.1 MMS Client

9.1.1 Client Level Function Groups

Item	Function	Reference	Status	Requirement
MMSCTR-CLF-C-001	Support for MMS Client Functions	7	M	MMSCTR-CLF-C-002 OR MMSCTR-CLF-C-003
MMSCTR-CLF-C-002	Support for Originating MMS Client Functions	7.1, 7.4	O	MMSCTR-SND-C-001 AND MMSCTR-DRP-C-001
MMSCTR-CLF-C-003	Support for Receiving MMS Client Functions	7.2, 7.3	O	MMSCTR-NTF-C-001 AND MMSCTR-FTC-C-001
MMSCTR-CLF-C-004	Capability Negotiation between Receiving MMS Client and MMS Proxy-Relay using the UAProf Component MMS Characteristics	7.3.1, 8	O	MMSCTR-CLF-C-003 AND UAProf: MCF

9.1.2 Send Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-SND-C-001	Send Transaction between Originating MMS Client and MMS Proxy-Relay	7.1	O	MMSCTR-SND-C-002 AND MMSCTR-SND-C-003
MMSCTR-SND-C-002	Originating MMS Client Sending M-Send.req to MMS Proxy-Relay	7.1.1	O	MMSCTR-PDU-C-001 AND MMSCTR-WSP-C-001
MMSCTR-SND-C-003	MMS Proxy-Relay Sending M-Send.conf to Originating MMS Client	7.1.1	O	MMSCTR-PDU-C-002 AND MMSCTR-WSP-C-002

9.1.3 Notification Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-NTF-C-001	Notification Transaction between MMS Proxy-Relay and Receiving MMS Client	7.2	O	MMSCTR-NTF-C-002 AND MMSCTR-NTF-C-003
MMSCTR-NTF-C-002	MMS Proxy-Relay Sending M-Notification.ind to Receiving MMS Client	7.2.1	O	MMSCTR-PDU-C-003 AND MMSCTR-PSH-C-001 AND MMSCTR-PSH-C-002 AND MMSCTR-PSH-C-003
MMSCTR-NTF-C-003	Receiving MMS Client Sending M-NotifyResp.ind to MMS Proxy-Relay	7.2.1	O	MMSCTR-PDU-C-004 AND MMSCTR-WSP-C-001

9.1.4 Fetch Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-FTC-C-001	Retrieval Transaction between Receiving MMS Client and MMS Proxy-Relay	7.3	O	MMSCTR-FTC-C-002 AND MMSCTR-FTC-C-003 AND MMSCTR-FTC-C-004
MMSCTR-FTC-C-002	Receiving MMS Client Sending Retrieve Request to MMS Proxy-Relay	7.3.1	O	MMSCTR-WSP-C-003
MMSCTR-FTC-C-003	MMS Proxy-Relay Sending M-retrieve.conf to Receiving MMS Client	7.3.1	O	MMSCTR-PDU-C-005 AND MMSCTR-WSP-C-004
MMSCTR-FTC-C-004	Receiving MMS Client Sending M-Acknowledge.ind to MMS Proxy-Relay	7.3.1	O	MMSCTR-PDU-C-006 AND MMSCTR-WSP-C-001

9.1.5 Delivery Report Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-DRP-C-001	Delivery Report Transaction between MMS Proxy-Relay and Originating MMS Client	7.4	O	MMSCTR-DRP-C-002
MMSCTR-DRP-C-002	MMS Proxy-Relay Sending M-Delivery.ind to Originating MMS Client	7.4.1	O	MMSCTR-PDU-C-007 AND MMSCTR-PSH-C-001 AND MMSCTR-PSH-C-002 AND MMSCTR-PSH-C-003

9.1.6 Read Reports

Item	Function	Reference	Status	Requirement
MMSC-RRP-C-001	Ability to Generate Read Report in Receiving MMS Client	7.5, 7.5.1	O	MMSC-SND-C-001
MMSC-RRP-C-002	Ability to Receive Read Report in Originating MMS Client	7.5, 7.5.1	O	MMSC-NTF-C-001 AND MMSC-FTC-C-001

9.1.7 PDU Encapsulation Dependencies

Item	Function	Reference	Status	Requirement
MMSC-PDU-C-001	Originating MMS Client Sending Encapsulated M-Send.req PDU to MMS Proxy-Relay	7.1.1	O	MMSE-C-017 AND MMSE-C-018 AND MMSE-C-019 AND MMSE-C-021 AND MMSE-C-025 AND MMSE-C-034
MMSC-PDU-C-002	MMS Proxy-Relay Sending Encapsulated M-Send.conf PDU to Originating MMS Client	7.1.1	O	MMSE-C-017 AND MMSE-C-018 AND MMSE-C-019 AND MMSE-C-035 AND MMSE-C-038
MMSC-PDU-C-003	MMS Proxy-Relay Sending Encapsulated M-Notification.ind PDU to Receiving MMS Client	7.2.1	O	MMSE-C-039 AND MMSE-C-040 AND MMSE-C-041 AND MMSE-C-044 AND MMSE-C-045 AND MMSE-C-046 AND MMSE-C-047
MMSC-PDU-C-004	Receiving MMS Client Sending Encapsulated M-NotifyResp.ind PDU to MMS Proxy-Relay	7.2.1	O	MMSE-C-039 AND MMSE-C-040 AND MMSE-C-041 AND MMSE-C-048
MMSC-PDU-C-005	MMS Proxy-Relay Sending Encapsulated M-retrieve.conf PDU to Receiving MMS Client	7.3.1	O	MMSE-C-050 AND MMSE-C-053 AND MMSE-C-054 AND MMSE-C-055 AND MMSE-C-056 AND MMSE-C-057 AND MMSE-C-060 AND MMSE-C-068
MMSC-PDU-C-006	Receiving MMS Client Sending Encapsulated M-Acknowledge.ind PDU to MMS Proxy-Relay	7.3.1	O	MMSE-C-070 AND MMSE-C-072

MMSCTR-PDU-C-007	MMS Proxy-Relay Sending Encapsulated M-Delivery.ind PDU to Originating MMS Client	7.4.1	O	MMSE-C-070 AND MMSE-C-072 AND MMSE-C-074 AND MMSE-C-075 AND MMSE-C-076 AND MMSE-C-077
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9.1.8 WAP PUSH Dependencies

Item	Function	Reference	Status	Requirement
MMSCTR-PSH-C-001	MMS Proxy-Relay Using WAP PUSH Operation to Send MMS PDU to MMS Client	7.2.1, 7.4.1	O	MMSCTR-PSH-C-004 OR MMSCTR-PSH-C-005 OR MMSCTR-PSH-C-006 OR MMSCTR-PSH-C-007
MMSCTR-PSH-C-002	Format and Contents of Push Message	7.2.1, 7.4.1	O	MSG-GEN-C-002 AND MSG-GEN-C-003 AND MSG-GEN-C-005
MMSCTR-PSH-C-003	Push Application Addressing and Dispatching to MMS Client	7.2.1, 7.4.1	O	OTA-GEN-C-002 AND OTA-GEN-C-003
MMSCTR-PSH-C-004	Non-secure Port for Connectionless Push	7.2.1, 7.4.1	O	OTA-CL-C-001 AND OTA-CL-C-002
MMSCTR-PSH-C-005	Secure Port for Connectionless Push	7.6, 7.2.1, 7.4.1	O	OTA-CL-C-001 AND OTA-CL-C-003
MMSCTR-PSH-C-006	Non-secure Port for Connection Oriented Push	7.2.1, 7.4.1	O	OTA-CO-C-001 AND OTA-CO-C-004
MMSCTR-PSH-C-007	Secure Port for Connection Oriented Push	7.6, 7.2.1, 7.4.1	O	OTA-CO-C-001 AND OTA-CO-C-005

9.1.9 WSP/HTTP Dependencies

Item	Function	Reference	Status	Requirement
MMSCTR-WSP-C-001	MMS Client Using WSP/HTTP POST Request to Send MMS PDU to MMS Proxy-Relay	7.1.1, 7.2.1, 7.3.1	O	WSP-C-001
MMSCTR-WSP-C-002	MMS Proxy-Relay Using WSP/HTTP POST Response to Send MMS PDU to MMS Client	7.1.1	O	WSP-C-001

MMSCTR-WSP-C-003	MMS Client Using WSP/HTTP GET Request to Request MMS PDU from MMS Proxy-Relay	7.3.1	O	WSP-C-001
MMSCTR-WSP-C-004	MMS Proxy-Relay Using WSP/HTTP GET Response to Send MMS PDU to MMS Client	7.3.1	O	WSP-C-001

9.2 MMS Proxy-Relay

9.2.1 Server Level Function Groups

Item	Function	Reference	Status	Requirement
MMSCTR-SLF-S-004	Capability Negotiation between Receiving MMS Client and MMS Proxy-Relay using the UAProf Component MMS Characteristics	7.3.1, 8	O	UAProf: MSF

9.2.2 Send Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-SND-S-001	Send Transaction between Originating MMS Client and MMS Proxy-Relay	7.1	M	MMSCTR-SND-S-002 AND MMSCTR-SND-S-003
MMSCTR-SND-S-002	Originating MMS Client Sending M-Send.req to MMS Proxy-Relay	7.1.1	O	MMSE-S-078
MMSCTR-SND-S-003	MMS Proxy-Relay Sending M-Send.conf to Originating MMS Client	7.1.1	O	MMSE-S-078

9.2.3 Notification Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-NTF-S-001	Notification Transaction between MMS Proxy-Relay and Receiving MMS Client	7.2	M	MMSCTR-NTF-S-002 AND MMSCTR-NTF-S-003
MMSCTR-NTF-S-002	MMS Proxy-Relay Sending M-Notification.ind to Receiving MMS Client	7.2.1	O	MMSE-S-079 AND MMSCTR-PSH-S-002
MMSCTR-NTF-S-003	Receiving MMS Client Sending M-NotifyResp.ind to MMS Proxy-Relay	7.2.1	O	MMSE-S-079

9.2.4 Fetch Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-FTC-S-001	Retrieval Transaction between Receiving MMS Client and MMS Proxy-Relay	7.3	M	MMSCTR-FTC-S-002 AND MMSCTR-FTC-S-003 AND MMSCTR-FTC-S-004
MMSCTR-FTC-S-002	Receiving MMS Client Sending Retrieve Request to MMS Proxy-Relay	7.3.1	O	
MMSCTR-FTC-S-003	MMS Proxy-Relay Sending M-retrieve.conf to Receiving MMS Client	7.3.1	O	MMSE-S-080
MMSCTR-FTC-S-004	Receiving MMS Client Sending M-Acknowledge.ind to MMS Proxy-Relay	7.3.1	O	MMSE-S-080

9.2.5 Delivery Report Transaction

Item	Function	Reference	Status	Requirement
MMSCTR-DRP-S-001	Delivery Report Transaction between MMS Proxy-Relay and Originating MMS Client	7.4	M	MMSCTR-DRP-S-002
MMSCTR-DRP-S-002	MMS Proxy-Relay Sending M-Delivery.ind to Originating MMS Client	7.4.1	O	MMSE-S-081 AND MMSCTR-PSH-S-002

9.2.6 WAP PUSH Dependencies

Item	Function	Reference	Status	Requirement
MMSCTR-PSH-S-002	Format and Contents of Push Message	7.2.1, 7.4.1	O	MSG-GEN-S-002 AND MSG-GEN-S-003 AND MSG-GEN-S-005

Appendix A.1. UAP Prof Schema for MMS Characteristics

This section is normative.

```
<?xml version="1.0"?>
  <rdf:RDF xmlns:rdf = "http://www.w3.org/TR/1999/02/22-rdf-syntax-ns#"
    xmlns:rdfs = "http://www.w3.org/2000/01/rdf-schema#"
    xmlns:prf="http://www.wapforum.org/profiles/MMS/ccpps-schema-20010111#"
    <rdf:Description ID="Component">
      <rdf:type resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
      <rdfs:subClassOf rdf:resource="http://www.w3.org/2000/01/rdf-
        schema#Resource"/>
      <rdfs:label>Component</rdfs:label>
      <rdfs:comment>
        A Component within the CC/PP Schema is a class of related
        properties that describe the capabilities and preferences
        information.
      </rdfs:comment>
    </rdf:Description>

    <!-- ***** Properties shared among the components***** -->
    <!-- ***** -->

    <rdf:Description ID="component">
      <rdf:type resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
      <rdfs:label>component</rdfs:label>
      <rdfs:comment>
        The component attribute links the various components to
        the root node(profile).
      </rdfs:comment>
    </rdf:Description>

    <!-- ***** Component Definitions ***** -->
    <!-- ***** -->

    <rdf:Description ID="MmsCharacteristics">
      <rdf:type resource="http://www.w3.org/2000/01/rdf-schema#Class"/>
      <rdfs:subClassOf rdf:resource="#Component"/>
      <rdfs:label>Component: MmsCharacteristics</rdfs:label>
      <rdfs:comment>
        The MmsCharacteristics component contains properties of the device's
        Multimedia messaging capabilities, such as maximum message size, maximum
        image resolution, etc.
      </rdfs:comment>
    </rdf:Description>

    <!-- ***** -->
    <!-- ***** Component: MmsCharacteristics ***** -->
    <!-- ***** -->
    <!-- ***** Attributes for component: MmsCharacteristics ***** -->
```

```

<rdf:Description ID="MmsMaxMessageSize">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
  <rdfs:comment>
    Description: Maximum size of an MMS message in bytes.
                Type:           Number
                Resolution:      Locked
                Examples:        2048
  </rdfs:comment>
</rdf:Description>

```

```

<rdf:Description ID="MmsMaxImageResolution">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
  <rdfs:comment>
    Description: The maximum size of an image in units of pixels
                 (horizontal x vertical).
                Type:           Literal
                Resolution:      Locked
                Examples:        80x60
  </rdfs:comment>
</rdf:Description>

```

```

<rdf:Description ID="MmsCcppAccept">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Bag"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
  <rdfs:comment>
    Description: Property value is a list of supported content types
                 where each item in the list is a content type name
                 registered as a MIME type
                Type:           Literal bag
                Resolution:      Locked
                Examples:        "image/jpeg", "audio/wav", "video/mpeg-4"
  </rdfs:comment>
</rdf:Description>

```

```

<rdf:Description ID="MmsCcppAcceptCharSet">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Bag"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
  <rdfs:comment>
    Description: List of character sets that the MMS Client supports.
                 Property value is a list of character sets, where
                 each item in the list is a character set name registered
                 with IANA
                Type:           Literal bag
                Resolution:      Locked
                Examples:        "US-ASCII", "ISO-8859-1"
  </rdfs:comment>
</rdf:Description>

```

```

<rdf:Description ID="MmsCcppAcceptLanguage">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>

```

```

<rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Bag"/>
<rdfs:domain rdf:resource="#MmsCharacteristics"/>
  <rdfs:comment>
    Description: List of preferred languages. The first item in the
                  list should be considered the user's first choice.
                  Property value is a list of natural languages, where
                  each item in the list is the name of a language as
                  defined by RFC 1766.
    Type:          Literal bag
    Resolution:    Locked
    Examples:      "en", "fr"
  </rdfs:comment>
</rdf:Description>

<rdf:Description ID="MmsCcppAcceptEncoding">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Bag"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
    <rdfs:comment>
      Description: List of transfer encodings that the MMS Client supports.
                    Property value is a list of transfer encodings, where
                    each item in the list is a transfer encoding name as
                    specified by RFC 2045 and registered with IANA.
      Type:          Literal bag
      Resolution:    Locked
      Examples:      "base64", "quoted-printable"
    </rdfs:comment>
  </rdf:Description>

<rdf:Description ID="MmsVersion">
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Property"/>
  <rdf:type rdf:resource="http://www.w3.org/2000/01/rdf-schema#Bag"/>
  <rdfs:domain rdf:resource="#MmsCharacteristics"/>
    <rdfs:comment>
      Description: The MMS versions supported by the MMS Client conveyed
                    as majorVersionNumber.minorVersionNumber.
      Type:          Literal bag
      Resolution:    Locked
      Examples:      "2.0", "1.3"
    </rdfs:comment>
  </rdf:Description>
</rdf:RDF>

```

Appendix A.2. History and Contact Information

Document history	
Date	Description
12 Apr 2001	Initial proposed version.
12 Jun 2001	<p>Initial approved version.</p> <p>Incorporates SCD WAP-206_100-MMSCTR-20010612. The changes are in Appendix A.1 UAPProf Schema for MMS Characteristics.</p> <ul style="list-style-type: none">• All but one of the URLs that have www.w3.org as server are changed to reflect new and approved version 2000 URLs.• The URL to the MMS profile on the www.wapforum.org server is changed to include “/profiles” in the path.• All ‘Bag’ URLs are now enclosed in double quotes.
09 Oct 2001	<p>Incorporates the Class 3 SIN WAP-206_101-MMSCTR-20011009. The changes are in section 9, “Static Conformance Requirements.” Some of the WAP specifications referenced by WAP-206-MMSCTR-20010612-a used incorrect syntax for SCR items. These SCR syntax errors have been fixed in the referenced specifications. Therefore this version updates the SCR Requirements column of a number of SCR items to match those fixes.</p>
Contact Information	
http://www.wapforum.org .	
Technical.comments@wapforum.org	

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